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Smart Irrigation Control System Using AT89S52 Microcontroller

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Abstract: **- This proper focus on smart irrigation control system. The main objective of this project is to develop irrigation system using AT89S52 microcontroller with internet, controlled by any android smart phone. Basically this project avoids continuous monitoring of farmer to water supply. The most proper advantages are to avoid the wastage of water, human intervention, implementation with low cost. As we know in 21st Century many automation technology invented in many fields for our easy life style. As same as that in irrigation also inventing the smart and easiest technology called smart irrigation control system.**

Keywords**- Sensorst; irrigationg; environmental parameters; water;**

I. INTRODUCTION

Now a days, the demand for good quality product is growing and worry about food safety and climate situation changes that are the key factors that have added for improved development of field in previous year's. In the green house lot of environmental parameter changes takes place. In a whole day humans cannot determine the environmental factor inside. By manually they get to know the condition inside the green house by manually. If the condition of the field is too humid, opening rooftop of green house during daytime, by doing this the growth of the plants will be irregular and hence the maximum production of the yield is not possible. This system is based on embedded system which closely controls and monitors the climate conditions like, humidity sensors, water level sensors, temperature, cooler, lighting etc, embedded system controls the ideal condition of the green house. In this embedded system the human intervention is avoided to a maximum extent.

II. LITRATURE SURVEY

The "essential" environmental conditions are determined and defined by farmers and researchers through many years of experimentation and today these optimum conditions are successfully achieved by implementing simple on-off control on actuators which use set-points as reference points for activation. However, with the advancements of computer technologies it has become possible to monitor and control multiple parameters simultaneously and to implement highly developed control techniques which are based on modern control theories. These control schemes depend on mathematical models, describing the dynamics of the coupled crop-green house system, to dynamically adjust set-points to provide essential conditions for a given performance criteria Several greenhouse models, based on energy and mass balance equations have been investigated in the past and they can be classified as static or dynamic models. More complex models are coupled with the crop dynamics (Jones et al, 1988; Jones et al., 1990; Takakura et al., 1971) and they include several state variables describing the status of the system over time. Some models were focused on specific environmental control methods, for example, natural ventilation (Al-helal, 1998; Boulard and Draui, 1995; Boulard et al., 1999; Dayan et al., 2004; Jong, 1990)[4], forced ventilation (Arbel et al., 2003; Willits, 2003), evaporative cooling (Abdel-Ghany and Kozai, 2006; Baille et al., 1994; Boulard and Baille, 1993; Boulard and Wang, 2000), or heating systems (Bartzanas et al., 2005; Kempkes et al., 2000) The latest technologies review of Miss.Vrushali.R.Deore, Prof. V.M.Umalediscussed in their paper Wireless Monitoring of greenhouse system using Embedded Controller, the wireless sensor network (WSN) which were used in the project for precision cultivation of crops. Also implemented this project in the nearby green house which was located in Nasik the results were quite amazing. Jia Song, he proposed a system on Greenhouse Monitoring and Control System using 8051 controller. He, Guomi Wang, Xiachan; Sun,Guoxiang. They had discussed about humidity and moisture monitoring and greenhouse using WiFi monitoring system .

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III. PROPOSED SYSTEM

The proposed system is proposed for monitor and controls the environmental parameters of a greenhouse precisely. On the normal starting point for cultivation of crops or specific plant species which has maximize production in the current growth season. To abolish the difficulty implicated in the system and reducing human intervention to maximum extent.The system consists of sensors, ADC, microcontroller and actuators. When any parameter increases or decreases a threshold value then sensor senses the change and microcontroller gets data from input ports which are being converted into digital form by ADC.

Then microcontroller performs necessary actions by utilizing relays until the parameter value has brought back to its optimum level. The main function is done by microcontroller which is easy to setup, low-cost and effective. Since an LCD display is used so that user can known the condition inside greenhouse and entire system is user friendly. This system overcomes the drawbacks of existing set-ups mentioned in review and is designed in an easy way to maintain, flexible and low cost.

- Complexities involved in monitoring climatic parameters like humidity, temperature, illumination, soil pH etc., are which directly or indirectly manage plant growth.
- For automation process, the cost is high. When two or more parameter concurrently then one system is not sufficient.
- The systems are high maintenance and skilled technical labours are needed. Modern proposed systems use various wireless technologies for data acquisition system which provides global access to the information about present system. Since, several problems involved in complexity of system design, difficult in repairing and high price. And also consistency of the system is relatively low.

A.System Design

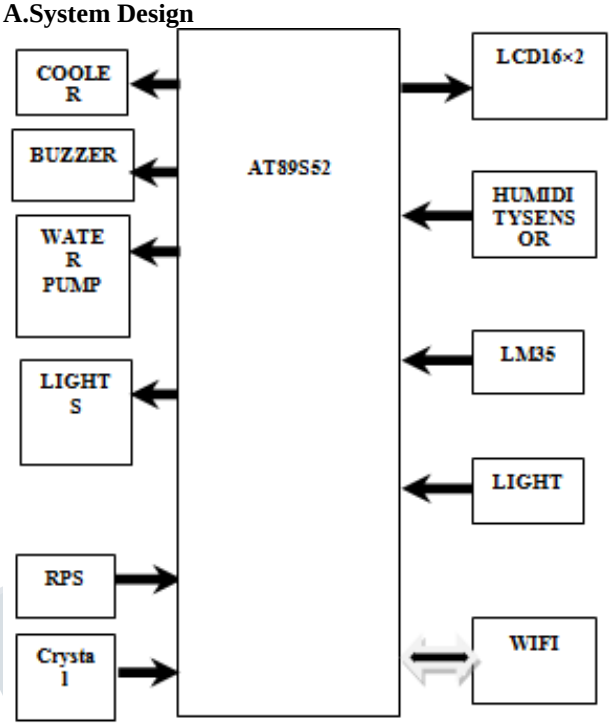

Fig3.1:Block diagram of microcontroller

In the project, system consists of AT89S52 microcontroller, temperature sensor (LM35), LDR (light dependent resistor) and humidity sensor. These sensors are connected to LPC 2148 microcontroller which is main processing unit of the system. Basically temperature is set to the point. The temperature sensor senses the change in input temperature. This analog signal is after signal conditioning is given to the analog input pin of the microcontroller. This microcontroller converts it to digital format using on chip ADC. If the temperature sensed is below the low limit it will switch off the heater. If the temperature sensed is above the set limit, it will start the cooler to bring the temperature down. Once it reached below a set point, it will switch off the cooler. In this way, temperature is controlled. Similarly, an intensity of light can be controlled. Initially an intensity point is set. Light dependent resistor senses the change in input intensity of light. If the intensity of light sensed is below the low limit set, the controller unit will switch on bulb. Once it reaches the set limit it will switch off the bulb. In this way, intensity of light is controlled. Humidity can be control by using a humidity sensor. Initially humidity is set. Humidity sensor senses the change in humidity. If the humidity sensed is below the low limit set, the controller unit will turn on the dehumidifier. Once it reaches the set limit it will switch on the humidifier. In this way, humidity is controlled.

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After it senses intensity of temperature, light and humidity it gives display at the output on LCD. An embedded system is a special function of the system in which the computers is completely encapsulated by or assign to the device or system it controls. On contrasting to general purpose computer like personal computer, an embedded system executes one or few predefined tasks. Since it is dedicated to particular tasks, design engineers can optimize it, minimizing the size and cost of the product. Embedded systems are produced in large quantity which increases profit in the market. The hardware components which are used are listed below:

1. Power supply
2. Stepper motor
3. ARM 7
4. LDR
5. LCD
6. Humidity sensor
7. Temperature sensor
8. Buzzer
9. Relays
10. Wi-Fi network

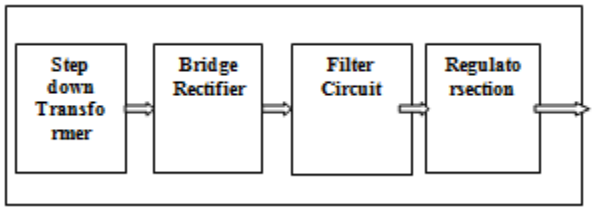

Fig3.2: Power Supply

A gadget or system that supplies electrical or different sorts of energy to an output load or set of load is called a power supply. This power supply converts AC signal to DC signal and also decreases the amplitude of the signal. The obtained voltage signal from mains is 20V/50Hz an AC voltage should be in DC voltage (no frequency) with +5V and +12V amplitude as per the requirement of different applications.

B. System Overview

Design Specifications:

This section explains the design specification and requirement of the system in detail.

Controlling Station Requirements:

The controlling station needs to be able to

1. Send a data collection request to sensor station
2. Send control instructions to sensor station
3. Data processing
a) Data Storage
b) Visually display real-time data

Sensor Station Requirements

The sensor station needs to be able to

1. Receive a data collection request from the controlling station
2. Collect data from the environment
3. Perform analog to digital conversion on data collection
4. Send data packets to the sensor station

Design Constraints

The following are design constraints that are needed to be considered

1. The system must be compact and portable.
2. The system must have low power consumption.
3. The system must be reliable, robust and a friendly user interface.

IV. CONCLUSION

In this project, simple approach is made for designing the embedded based system for measurement and control of major essential factors for plant growth i.e., temperature, humidity and light intensity. Apparently, all such factors are updated by the system and human need not inspect the plants or crops continuously, thus labour charges are saved. The results obtained from parameter measurements are shown that the system performance is accurate and can be compatible to real system.

Automation and high efficiency of the system monitoring and control are critical. If parameters are in accessible range then the value is visualized in LCD. If it is not within the range the controller will turn on/off the actuators as per the requirements. Thus greenhouse is operated automatically without human intervention. The system is satisfactorily performs the function and prevail over a minor limitation of the existing system by power saving, less maintenance and design complexity. A system provides flexible and precise form of maintaining the atmosphere.

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